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USDOC FOR 532/OEA/M. NICKSON-D/L. LAUCIUS/JAY HATFIELD  
USDOC FOR 3131/USFCS/OIO/ANESA/KREISSL  
USDOC FOR 4530/MAC/ANESA/OSA  
ICE HQ FOR STRATEGIC INVESTIGATIONS  
STATE FOR EB/ESP

E.O. 12958: N/A

TAGS: [ETTC](#) [ETRD](#) [BEXP](#) [IN](#)

SUBJECT: EXTRANCHECK: PRE-LICENSE CHECK: GRAPHITE INDIA LTD.,  
BANGALORE, LICENSE D377329

REF: USDOC 05519

¶1. Unauthorized disclosure of the information provided below is prohibited by Section 12(c) of the Export Administration Act.

¶2. Export Control Officer (ECO) Paul Cushman and BIS FSN Prem Narayan conducted a Pre-license Check (PLC) at Graphite India Ltd. (GIL), Bangalore, on June 26, 2007.

¶3. BIS requested a PLC at GIL, a private sector company, located at: Graphite India Ltd., Visvesvaraya Industrial Area, Whitefield Road, Bangalore, 560048, Tel: 91-80-2852-4061, Fax: 91-80-2852-4072, email: blrvpw@graphiteindia.com, website: www.graphiteindia.com. GIL was listed as the ultimate consignee for hot isostatic press (HIP) controlled under ECCN 2B352. The license applicant was Engineered Pressure Systems Inc. (EPSI), Haverhill, MA.

¶4. ECO along with FSN Narayan met with Ulhas D. Wadivkar (Wadivkar), Vice President-Works and Dr. R. Raghunand (Raghunand), Senior Manager - R&D, GIL.

¶5. GIL representatives were not aware of the BIS regulations. This was the first visit by BIS or USG officials to GIL. GIL representatives provided a copy of GIL Purchase Inquiry, GIL End-User Statement and email correspondence between GIL and EPSI concerning the proposed transaction.

¶6. Wadivkar stated that GIL plans to erect a new plant within the GIL Bangalore facility to manufacture graphite brake discs for new Indian Light Combat Aircraft (LCA) and the HIP on order will be housed within this plant. The estimated cost for the new plant will be approximately 25 million USD. ECO inquired why GIL initiated the purchase process before beginning construction of the new plant. Wadivkar explained that a HIP is a custom-made product and requires 9-18 months to produce and deliver.

¶7. Wadivkar stated that GIL and Advanced System Laboratory, a Defence Research Development Organization (DRDO) agency, are jointly developing the graphite brake discs for the LCA. GIL and Aeronautical Development Agency (ADA), Bangalore (another DRDO establishment) have agreed that GIL will manufacture the LCA brake discs at ADA specifications. He stated that a preliminary MOU between GIL and ADA designates GIL as the exclusive producer/supplier of brake discs for the LCA. GIL did not share a copy of this document with BIS.

¶8. GIL representatives arranged a meeting for the BIS Team with ADA's Project Director for Propulsion & General Systems K.G. Vivek (Vivek) who will serve as project manager for ADA. The meeting was held at the ADA Conference Room. Vivek stated that ADA's major

activities include design and analysis, testing and qualification, avionics and flight control, simulation, weapon systems, flight-testing, LCA production, and software development. Hindustan Aeronautics Ltd. (HAL) produces the LCA based upon ADA designs. He also stated that the engines for the LCA are being sourced from General Electric. HAL has already produced twenty LCAs and five of them (prototype models) are operational. He further stated that ADA conducts approximately 38 LCA test flights per week. To date, ADA has conducted 690 test flight of the LCA (TEJAS model). The LCA is scheduled to enter service with the Indian Air Force in 2010.

¶9. Vivek stated that the brake discs currently installed on the LCA are heavier and have a poor wear rate. The graphite brake discs that will be manufactured by GIL using the HIP will be much lighter and will have a substantially improved wear rate (approximately 300 landings). Vivek stated that graphite is preferred over other materials because of its light weight, thermal shock resistance, high thermal conductivity, low thermal expansion and good chemical resistance.

¶10. Although the HIP will be used at the GIL facility, ECO advised Vivek that ADA should also submit an end-use statement to EPSI describing the intended use of the brake discs sourced from GIL.

¶11. On July 6, 2007, BIS New Delhi received a copy of the end-use statement ADA submitted to EPSI. The following text is quoted from it: "ADA, Bangalore, is responsible for design and development of LCAs for Indian Airforce. LCA (Tejas) utilizes carbon-carbon composite brake discs as braking element in brake assembly. The carbon-carbon brake discs for LCA are being productionized by GIL, Bangalore, who have set up the facilities for fabrication of C-C brake discs at Bangalore. HIP which is necessary for enhancing the productivity and quality of C/C discs, is required to be established by GIL. The C/C brake discs made by GIL, Bangalore, are exclusive for LCA application and does not have any missile/nuclear/biological

warfare application".

¶12. Wadivkar confirmed the stated end-use of the HIP. Currently, GIL produces the carbon graphite brake discs using an indigenous system. Petroleum coke is used as the raw material for making the carbon. It then goes through various manufacturing processes including high pressure at elevated temperatures and finally, it is graphitized. The end product is thicker in size but through graphitization it is reduced to 200 mm in size. One carbon graphite disc is comprised of seven carbon discs.

¶13. He stated that the existing system enables them to complete only 8-10 production cycles per annum. The manufacturing process is lengthy and cumbersome. Using the HIP will greatly reduce the manufacturing time because the manufacturing processes will not require repetition. Using the HIP, GIL will be able to complete 75-80 production cycles per annum. The HIP is designed to apply accurate pressure uniformly at elevated temperatures and is ideal for the casting, ceramics, plastics, automotive, and aerospace industries. The HIP system densifies materials to correct casting defects and voids, bond similar or dissimilar materials and to form net or near-net shapes from metal, ceramic, cement and graphic powders.

¶14. The BIS Team was given a tour of the existing brake disc manufacturing facility. Wadivkar explained the current brake disc manufacturing process and how the HIP will assist their operation in producing far superior brake discs. The GIL factory is enclosed and guarded 24/7.

¶15. Established in 1963, GIL is one of the largest manufacturers of graphite electrodes in India. It has four manufacturing locations in India including Durgapur, West Bengal; Bangalore, Karnataka; Nashik, Maharashtra; and Barauni, Bihar. In addition, GIL has a plant in Germany that caters to the European market. The graphite products that GIL manufactures include graphite electrodes, calcined petroleum coke, carbon paste, glass fiber-reinforced plastic pipes and tanks, and other customized specialty products. In addition, it manufactures impervious graphite equipment which includes chemical equipment and graphite heat exchangers, sulphuric acid dilution cooling units, thermometer pockets, pipe valves and fittings, dry

HCI gas generation units, centrifugal pumps, HCI synthesis units, HCI absorption system, bursting disc and ejector systems.

¶16. The Bangalore plant produces specialty graphite products. GIL India produces approximately 70,000 tons of graphite electrodes per annum. Of that 70,000 tons, approximately 7,000 tons of graphite electrodes are produced by the GIL Bangalore plant. In addition, the GIL Bangalore plant also produces approximately 3,000 tons of specialty graphite products. GIL's major customers are from the metallurgical (ferrous and nonferrous), chemical, aerospace and nuclear industries. GIL exports 75 percent of its total production to approximately 150 customers in 50 countries. GIL employs approximately 3,000 personnel including 400 in the Bangalore plant. GIL's sales turnover for FY 2006 was approximately 210 million USD.

¶17. Recommendation: Post recommends Graphite India Ltd. as a reliable recipient of the controlled U.S.-origin commodity. All indications are that the listed commodity will be used in accordance with U.S. Export Control Regulations. (PSCUSHMAN/PNARAYAN) Pyatt